

ABSTRACT

A system and method for image sensing and processing using the Arithmetic Fourier Transform (AFT). An image sensing array has sensors located based on a set of Farey fractions, each multiplied by a unit block size of the array. Similar sampling can be achieved by interpolating the pixel values of a conventional, uniformly spaced array of sensors. The AFT can be determined extremely efficiently by computing weighted sums of the representative pixel values. Corresponding Discrete Cosine Transform (DCT) coefficients can then be computed by scaling the AFT coefficients. As a result, the number of multiplication operations required to compute the DCT is dramatically reduced.